An integrated attitude model of self-service technologies: evidence from online stock trading systems brokers

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This study develops an integrated causal path analysis, based on both category-based affect theory and the technology acceptance model (TAM), to identify the antecedents of consumers' attitudes toward self-service technologies. Using online stock trading systems as an example (N = 267), this study employs structural equation modeling to confirm the research structure. The results reveal that consumers' attitudes toward self-service technologies depend on their attitude toward technologies and attitude toward self-services, in support of category-based affect theory. Further, computer self-efficacy and network information literacy positively influence attitude toward technologies, and both perceived ease of use and perceived usefulness positively influence attitude toward self-service technologies, which were proposed in the two theories, were also found. Therefore, this study suggests that integrated attitude model of the category-based affect and TAM can be applied to properly explain the attitude forming toward self-service technologies, and can be fruitful for future research on the diffusion of Internet-based technological systems.

Keywords: self-service technology; technology acceptance model; category-based affect

Introduction

The attempt to improve service delivery and maintain sustainable customer service while lowering labor costs has prompted the introduction of automated service delivery systems in various industries. Self-service technologies, which are often based on computerization or technological advances, allow (or force) consumers to help produce their own service encounters through machine interactions rather than interactions with service personnel. Well-known examples include airline ticketing machines, automatic teller machines, online shopping systems, and so on.

In response to the increasing role of technology in services, researchers have begun to explore issues related to self-service technologies. Previous research measures the service quality of self-service technologies (Brown, Churchill, & Peter, 1993; Dabhokar, 1996; Oliver, 1997; Shamdasani, Mukherjee, & Malhotra, 2008; Yu, 2008), largely by focusing on the effects of specific self-service technology traits on service performance. Therefore, some researchers explore customer perceptions and usage of service delivery technologies, for example, an incident study notes the advantages of these self-service technologies in

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terms of enhancing consumer satisfaction, including greater access in ‘urgent’ situations, improved service compared with face-to-face encounters (e.g. in terms of time, money, ease of use, flexibility) (Meuter, Ostrom, & Bitner, 2000), increased customization (Meuter & Bitner, 1998; Meuter et al., 2000), and the fun of engaging in technical service (Dabholkar, 1994). However, for some customers, technical service provision entails anxiety, doubt, and fear of failure (Mick & Fournier, 1998).

Customers consider the benefits and costs of learning new technologies to determine if it is necessary to apply them (Gatingon & Robertson, 1991). Consumer characteristics, such as inertia, need for interaction, pervious experience and demographics of individual, as well as situational differences, have also been shown to have an impact on consumer evaluations of self-service technologies (Meuter, Bitner, Ostrom, & Brown, 2005). Consumers’ ability and confidence in using new technologies may also influence their attitude toward adopting new technologies. This study explores an empirical assessment from online stock trading system. Since financial transaction amount in general is huge and the process is highly complex, which implies that online stock trading system is a high perceived risk service and requires technological involvement for investors. Consequently, this study applies computer self-efficacy and network information literacy and tests their influences in the formation of adopting self-service technologies.

Bobitt and Dabholkar (2001) propose an integrated attitudinal theory model to explain consumers’ attitude, intentions, and behavior in the face of self-service technologies. Those well-known theories included category-based affect, theory of planned behavior, theory of reasoned action and theory of trying. With its integrative approach to theory, also contribute to attitudinal literature. We return to the concept of category-based affect (Fiske, 1982), which suggests customers use their existing category experience to assess collective information and then display simple but comprehensive likes and dislikes. Bobitt and Dabholkar (2001) also indicate that attitude toward self-service technologies results from consumers’ attitude toward using technology and toward self-service, therefore, forming the theoretical framework as the basis of this study.

While the technology acceptance model (TAM), introduced in 1986, continues to be the most widely applied theoretical model in the area of information technology research (Davis, 1989).

Furthermore, few previous empirical studies have attempted to integrate both category-based affect and TAM then to explain individual consumers’ cognitive and affective factors that affect the attitude toward self-service technologies. Given that a considerable amount of diffusion research in new technologies has accumulated, it is rare that theoretical models have gone beyond profiling consumer characteristics with regard to the perception and attitude forming of self-service technologies. Thus, this study based on category-based affect (Fiske, 1982) and the TAM (Davis, 1989) to develop an integrated causal path analysis that influences the users’ attitude toward online stock trading systems brokers and suggests a model that explains the dynamics of investors’ acceptance of the system.

Literature review and hypotheses development

Computer self-efficacy

The constant growth of new technologies makes it important to explore consumers’ ability and willingness to adopt them. From a psychological perspective, self-motivation is more effective than self-ability when consumers decide whether to adopt, and self-efficacy plays a key role in self-motivation (Torkzadeh & Koufteros, 1994). In particular, computer self-efficacy refers to the subjective judgment that a person possesses sufficient skills to
complete work using computers rather just his or her skill in operating a computer (Igbaria & Iivari, 1995). Most people who resist self-service technologies might not actually lack the skills to use computers but instead believe strongly in their lack of such skills, which produces their resistant attitudes. Compeau and Higgins (1995) thus predict computer usage on the basis of people’s computer self-efficacy, computer anxiety, computer favor, workplace performance, and expectations. Their results indicate that computer self-efficacy is the most important predictor, which relates positively to consumers’ attitude toward technologies (Agarwal, Sambamurthy, & Stair, 2000). Therefore, we propose:

\[ H1: \text{Consumers’ computer self-efficacy positively affects their attitude toward technologies.} \]

**Network information literacy**

The term ‘information literacy’, originated by Zurkowski (1974), refers to a person’s skills with regard to finding, evaluating, and using information coming from various sources. Jones (1992) also includes being aware of the need for information and realizing the content of that need in their definition. Therefore, we assert that information literacy enables people to search, evaluate, organize, and use information effectively. McClure (1994) also extends the concept in the network era to network literacy, which comprises both knowledge and skills. Knowledge features awareness of the network of information resources and services, understanding of the role and uses of network information for problem solving, and understanding the generation and management of network information. Skills instead refer to the ability to use information discovery tools to acquire specific types of information, integrate network information with other resources, use network information to analyze and resolve decisions, and enhance the quality of life. Because networks represent important means for modern people to acquire information, people with higher network information literacy can make good use of their network information and network tools to solve problems efficiently, particularly, online trading implies a service activity with a high degree of technological involvement, the network information literacy is essential for users. Thus, we provide the following hypothesis:

\[ H2: \text{Consumers’ network information literacy positively affects their attitude toward technologies.} \]

**Category-based affect**

Consumers judge new situations, products, and services according to their past attitudes and experiences (Bobbitt & Dabholkar, 2001). Category-based affect entails similar behavior categories (Fiske, 1982). When consumers encounter a new stimulus that is similar to their past experiences, it triggers stored category-based affect, so they can spontaneously react to information with an affective evaluation, or overall like or dislike toward the new object. This information process is also called the ‘schema-driven effect’ (Sujan, 1985), because category experience provides the guidance for evaluating information.

Two forms of category-based affect are relevant for our framework: attitude toward self-service and attitude toward technologies, which is proposed by Bobbitt and Dabholkar (2001) to explain consumers’ attitude toward self-service technologies, but they do not test their propositions with empirical data. This study therefore focuses on the antecedents of attitude toward self-service technologies bases on category-base affect (Fiske, 1982), and TAM (Davis, 1989), and adopts their reasonable propositions to explain and predict attitudes toward self-service technologies that thoroughly examine real material from the customer perspective.
H3: Consumers' attitude toward self-service positively affects their attitude toward self-service technologies.
H4: Consumers' attitude toward technologies positively affects their attitude toward self-service technologies.

TAM

TAM is considered the most influential and commonly employed theory for describing an individual's adoption of new information systems or computer technologies. Using the theory of reasoned action, Davis (1989) proposes that an individual's information systems acceptance is determined by two major variables: perceived usefulness and perceived ease of use. When a user thinks an information system is practical—that is, perceives it as useful—he or she develops a positive attitude toward using it. Perceived ease of use, or the belief that using an information system is free of effort, affects the user's attitude through the influence of self-efficacy. A system that is easy to use is less likely to restrict a user in terms of his or her operational skills, and he or she is more likely to enjoy its efficiency and adopt a positive attitude toward it. Perceived ease of use also affects perceived usefulness, such that when a user considers the system easy to use, he or she fulfills more tasks with the same time and energy. Many studies have verified the TAM with regard to consumers' adoption of Internet-based services in various applied platforms (e.g. Pikkarainen, Pikkarainen, Karjaluo, & Pahnila, 2004). Similarly, we propose:

H5: Perceived ease of use of self-service technologies positively affects attitudes toward self-service technologies.
H6: Perceived usefulness of self-service technologies positively affects attitudes toward self-service technologies.
H7: Perceived ease of use positively affects perceived usefulness.

We summarize these hypotheses and research framework in Figure 1.

Methodology

This study proposes a model of consumers' attitude toward self-service technologies. To test the model, we employed structural equation modeling with AMOS, we also used

![Figure 1. Conceptual model and hypotheses.](#)
confirmatory factor analysis (CFA) to test the reliability and construct validity of the measures in the model. Moreover, we verified the hypotheses through the structural model.

**Measures**

All the measures came from existing literature but were slightly modified to fit the study purposes. Seven-point Likert scales used endpoints of ‘strongly disagree’ (1) and ‘strongly agree’ (5). We pretested the survey instrument with a convenience sample of 47 participants to assess its clarity. The final constructs and measures appear in Table 1.

Two conceptual items, computer self-efficacy and network information literacy, summarize consumers’ cognition of technology. Self-efficacy denotes ‘people’s judgments of their capabilities to organize and execute courses of action required attaining designated types of performances’ (Bandura, 1986, p. 391). Computer self-efficacy entails users’ cognition about which skills they possess with regard to using a computer system (Compeau & Higgins, 1995). To measure computer self-efficacy, we modified Venkatesh and Davis’s (1996) scale, such that two items refer to the skills and knowledge needed to operate a computer system. For network information literacy, we considered both McClure’s (1994) introduction of the concept and its extension to new kinds of information literacy or ‘digital literacy’ (Bawden, 2001). As we noted previously, we define network information literacy as the ability to access, organize, and use network information to solve problems and make decisions, which reflects users’ self-aware capabilities to retrieve and evaluate information using the Internet. Four items measure network information literacy (McClure, 1994).

**Attitude toward self-service**

With self-service, a customer completes the service activities by him- or herself, without direct aid from service staff. Consumers’ evaluations of self-service are multidimensional, including convenience, self-control, time saved, money saved, self-image, risk, and self-fulfillment (Globerson & Maggard, 1991). We refined a nine-item scale to include six items, after our reliability test and factor analysis. The six items refer to three factors, namely, convenience, self-control, and economy. We assigned the six items to these three measures of attitude toward self-service to make the model parsimonious and maintain the multidimensional nature of this construct (Little, Cunningham, Shahar, & Widaman, 2002).

**Attitude toward technologies**

Consumers’ overall evaluations of technologies are also multidimensional. We adapted the technology readiness index (TRI; Parasuraman, 2000) and the measure of technology anxiety (Scott & Rockwell, 1997) to measure attitudes toward technologies. Technology readiness is ‘people’s propensity to embrace and use new technologies for accomplishing goals in home life and at work’ (Parasuraman, 2000, p. 308), and the TRI contains four dimensions: optimism, innovativeness, discomfort, and insecurity. We used 13 items from the TRI scale to measure this construct. We confirmed its construct-related validity with factor analysis, which left 10 items. The scale thus contained four dimensions but 10 items assigned to measures of attitude toward technologies. Technology anxiety implies that people feel afraid and anxious or ask for help when they consider whether to use technologies (Scott & Rockwell, 1997). It also entails users’ skills and mental condition toward


